AMENDMENTS TO THE CLAIMS

Please cancel claims 22 through 73, such that the claims of the application have the following formulations and statuses:

1. (Previously presented) A ferromagnetic thin-film material based digital memory, said memory comprising:

a plurality of bit structures, each supported on a substrate and separated from one another by spacer material therebetween, and that are electrically interconnected with information retrieval circuitry, said bit structures each comprising magnetic material film in which a characteristic magnetic property is substantially maintained below a critical temperature above which such magnetic property is not maintained, said bit structures each having a first interconnection structure providing electrical contact thereto positioned against at least one side thereof; and

a plurality of word line structures each having a pair of word line end terminal regions adapted to conduct electrical current in at least one direction therethrough, each of said pairs of word line end terminal regions having an electrical conductor electrically connected therebetween with each said electrical conductor having a plurality of heat dissipation structures connected thereto that are each located across said spacer material from said magnetic material film in a corresponding one of said bit structures and exhibiting sufficient electrical resistance therein for a sufficient electrical current therethrough to cause substantial heating of said bit structure corresponding thereto to raise temperatures thereof to have said magnetic material film therein at least approach said critical temperature while being substantially above temperatures of at least an adjacent said bit structure

because of sufficient extents of, and smallness of thermal conductivities of, said first interconnection structure positioned against said corresponding bit structure and of those portions of said substrate and said spacer material positioned thereabout, said plurality of heat dissipating structures each having a location thereon spaced apart from where connected to a said electrical conductor that is selectively connectable so as to be capable of allowing electrical current to be established in that heat dissipating structure.

2. (Original) The device of claim 1 wherein said selected bit structure is electrically interconnected so that an electrical current is also establishable therethrough during said heating thereof so as to cause its temperature to more closely approach or exceed said critical temperature of said magnetic material film therein.

3. (Previously presented) The device of claim 1 wherein said magnetic material film is memory film of an anisotropic ferromagnetic material.

4. (Previously presented) The device of claim 1 wherein said magnetic material film is a magnetization direction maintaining film of an antiferromagnetic material, and said bit structures further comprise memory film of an anisotropic ferromagnetic material positioned adjacent to said magnetic material film.

5. (Previously presented) The device of claim 1 wherein said magnetic material film is a magnetization direction maintaining composite film including an antiferromagnetic material, and said bit structures further comprise memory film of an anisotropic ferromagnetic material positioned adjacent to said magnetic material film.

6. (Original) The device of claim 1 wherein said first interconnection structure extends to an adjacent one of said plurality of bit structures to make electrical contact thereto.

7. (Original) The device of claim 1 wherein said substrate comprises an electrical insulating layer over a monolithic integrated circuit, and further comprises via interconnection structures each providing electrical contact to a corresponding one of said plurality of bit structures where positioned against at least one other side thereof through said insulating layer to a corresponding circuit portion in said monolithic integrated circuit.

8. (Original) The device of claim 2 wherein another said bit structure in said plurality thereof is electrically connected in series with said selected bit structure so that any said electrical current established through said selected bit structure during said heating thereof is also established through said other bit structure but is insufficient to heat that said other bit structure to substantially approach said critical temperature thereof, a said electrical current being establishable through said selected bit structure and a said electrical current being establishable through that said heat dissipating structure across from said selected bit structure to cause together sufficient heating of said selected bit structure to allow that magnetization of a memory film of an anisotropic ferromagnetic material provided therein to be positioned in a selected direction by at least some portion of such electrical currents in less time than that maximum data storage time period allowed in that digital memory in which said selected bit structure is provided.

9. (Original) The device of claim 3 wherein said plurality of bit structures each further comprises an electrically insulative intermediate layer having two major surfaces on opposite sides thereof with said memory film on each of said intermediate layer major surfaces of thicknesses differing from one another outwardly from those surfaces by at least 5% to thereby primarily provide switching thresholds below said critical temperature for magnetizations of said film adjacent each of said intermediate layer major surfaces that differ in value for a switching of these magnetizations from

both being directed initially at least in part in substantially a common direction to being directed at least in part in substantially opposite directions versus a switching from being directed initially at least in part in substantially opposite directions to both being directed at least in part in substantially a common direction.

10. (Original) The device of claim 3 wherein said plurality of bit structures each further comprises an electrically insulative intermediate layer having two major surfaces on opposite sides thereof with said memory film on each of said intermediate layer major surfaces.

11. (Original) The device of claim 4 wherein said plurality of bit structures each further comprises an electrically insulative intermediate layer having two major surfaces on opposite sides thereof with said memory film on each of said intermediate layer major surfaces.

12. (Original) The device of claim 4 wherein said magnetization direction maintaining film is of an antiferromagnetic material having a blocking temperature as its critical temperature that is less than that Curie temperature characterizing said anisotropic ferromagnetic material of said adjacent memory film.

13. (Original) The device of claim 4 wherein said magnetization direction maintaining film is of an antiferromagnetic material having a blocking temperature as its critical temperature that is greater than that Curie temperature characterizing said anisotropic ferromagnetic material of said adjacent memory film.

14. (Original) The device of claim 5 wherein said plurality of bit structures each further comprises an electrically insulative intermediate layer having two major surfaces on opposite sides thereof with said memory film on each of said intermediate layer major surfaces.

15. (Original) The device of claim 5 wherein said magnetization direction maintaining composite film is of an antiferromagnetic material having a blocking temperature as its critical temperature that is less than that Curie temperature characterizing said anisotropic ferromagnetic material of said adjacent memory film.

16. (Original) The device of claim 5 wherein said magnetization direction maintaining composite film is of an antiferromagnetic material having a blocking temperature as its critical temperature that is greater than that Curie temperature characterizing said anisotropic ferromagnetic material of said adjacent memory film.

17. (Original) The device of claim 5 wherein said magnetization direction maintaining composite film including an antiferromagnetic material further includes two holding ferromagnetic layers separated by a ruthenium layer with said antiferromagnetic material having a blocking temperature as its critical temperature that is greater than that Curie temperature characterizing said anisotropic ferromagnetic material of said adjacent memory film.

18. (Original) The device of claim 8 wherein said maximum data storage time period of said digital memory is less than 100 ns.

19. (Original) The device of claim 10 wherein a said bit structure has a length along a selected direction and a width substantially perpendicular thereto that is smaller in extent than said length and has a shaped end portion extending over a portion of said length in which said width gradually reduces to zero at an end thereof.

20. (Original) The device of claim 11 wherein a said bit structure has a length along a selected direction and a width substantially perpendicular thereto that is smaller in extent than said length and

has a shaped end portion extending over a portion of said length in which said width gradually reduces to zero at an end thereof.

21. (Original) The device of claim 14 wherein a said bit structure has a length along a selected direction and a width substantially perpendicular thereto that is smaller in extent than said length and has a shaped end portion extending over a portion of said length in which said width gradually reduces to zero at an end thereof.

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